

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A method to segment a data object to facilitate transfer of said data object from a first computing system to a second computing system, comprising the steps of:
 - requesting a range of addresses within a storage device of the first computing system containing said data object;
 - determining a number of storage devices attached to said first computing system available to retain a plurality of segments of said data object;
 - determining a maximum digital data transfer load for the storage devices attached to said first computing system;
 - assigning a minimum segment size which is the smallest amount of digital data to be contained within one segment of the data object;
 - calculating a first segment size as a first function of a number of the storage devices, the current digital data transfer load, the maximum digital data transfer load, and the minimum segment size;

16 assigning a last segment size as the minimum segment size;

17 calculating all remaining segment sizes as a second function of the
18 number of the storage devices, the current digital data transfer
19 load, the maximum digital data transfer load, and the minimum
20 segment size; and

21 partitioning said data object into segments whereby the first segment
22 of the data object is of the first segment size, the last segment of
23 the data object is of the last segment size, and all the remaining
24 segments of the data object is of the remaining segment sizes.

1 2. (Original) The method of claim 1 further comprising the steps of:

2 assigning one of the number of storage devices to retain each segment
3 of the data object;

4 assigning an address within the storage devices to identify the location
5 of an assigned segment;

6 assigning an object name to each segment of the data object; and

7 transferring each segment to its assigned storage device.

1 3. (Original) The method of claim 1 wherein the first function to determine the
2 first segment size is:

$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

where

Seg1 is the first segment size,

min is the minimum function of two variables,

SegSize_{min} is the minimum segment size allowed
during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_l}{M_l - C_l} \right)$$

where

N_d is the number of storage devices
available to retain the segments of the
data object,

M_l is the maximum digital data transfer
load, and

18 C_i is the current digital data transfer
19 load.

1 4. (Original) The method of claim 1 wherein the second function to determine
2 the remaining segment sizes is:

3
$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

4 where

5 **Segn** is the a segment size for one segment of the
6 remaining segments,

7 **max** is the maximum function of two variables,

8 **SegSize_{min}** is the minimum segment size allowed
9 during the fragmenting of the video data file,

10 **V** is a total size of the data object, and

11 **f** is determined by the formula:

12
$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right)$$

13 where

14 N_d is the number of storage devices
15 available to retain the segments of the
16 data object,
17 M_l is the maximum digital data transfer
18 load, and
19 C_l is the current digital data transfer
20 load.

1 5. (Original) The method of claim 1 further comprising the step of:
2 determining a file interactivity factor describing a number of jumps by
3 the second computing system within the data object.

1 6. (Original) The method of claim 5 wherein the first function is further
2 dependent upon the file interactivity factor.

1 7. (Original) The method of claim 6 wherein the first function to determine the
2 first segment size is:

3
$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

4 where

5 Seg1 is the first segment size,

6 \min is the minimum function of two variables,

SegSize_{min} is the minimum segment size allowed
during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + I$$

where

N_d is the number of storage devices
available to retain the segments of the
data object,

M_i is the maximum digital data transfer
load,

C_i is the current digital data transfer
load, and

I is the file interactivity factor.

8. (Original) The method of claim 5 wherein the second function is further
dependent upon the file interactivity factor.

9. (Original) The method of claim 8 wherein the second function to determine the remaining segment sizes is:

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

where

Segn is the a segment size for one segment of the remaining segments,

max is the maximum function of two variables,

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + 1$$

where

N_d is the number of storage devices available to retain the segments of the data object,

17 M_i is the maximum digital data transfer
18 load,
19 C_i is the current digital data transfer
20 load, and
21 I is the file interactivity factor.

1 10. (Original) The method of claim 1 further comprising the step of:
2 determining a file usage factor describing a number of requests for
3 said data object for a period of time.

1 11. (Original) The method of claim 9 wherein the first function is further
2 dependent upon the file usage factor.

1 12. (Original) The method of claim 10 wherein the first function to determine
2 the first segment size is:

3
$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

4 where

5 **Seg1** is the first segment size,

6 **min** is the minimum function of two variables,

SegSize_{min} is the minimum segment size allowed
during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H$$

where

N_d is the number of storage devices
available to retain the segments of the
data object,

M_i is the maximum digital data transfer
load,

C_i is the current digital data transfer
load, and

H is the file usage factor.

13. (Original) The method of claim 9 wherein the second function is further
dependent upon the file usage factor.

14. (Original) The method of claim 13 wherein the second function to
determine the remaining segment sizes is:

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

where

Segn is the a segment size for one segment of the
remaining segments,

max is the maximum function of two variables,

SegSize_{min} is the minimum segment size allowed
during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H$$

where

N_d is the number of storage devices
available to retain the segments of the
data object,

17 M_i is the maximum digital data transfer
18 load,

19 C_i is the current digital data transfer
20 load, and

21 H is the file usage factor.

1 15. (Original) The method of claim 1 further comprising the steps of:

2 determining a file usage factor describing a number of requests for
3 said data object for a period of time; and

4 determining a file interactivity factor describing a number of jumps by
5 the second computing system within the data object.

1 16. (Original) The method of claim 15 wherein the first function is further
2 dependent upon the file usage factor and the file interactivity factor.

1 17. (Original) The method of claim 16 wherein the first function to determine
2 the first segment size is:

3
$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

4 where

5 Seg1 is the first segment size,

min is the minimum function of two variables,

SegSize_{min} is the minimum segment size allowed
during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H + I$$

where

N_d is the number of storage devices
available to retain the segments of the
data object,

M_i is the maximum digital data transfer
load,

C_i is the current digital data transfer
load,

H is the file usage factor, and

I is the file interactivity factor.

18. (Original) The method of claim 15 wherein the second function is further dependent upon the file usage factor and the file interactivity factor.

19. (Original) The method of claim 18 wherein the second function to determine the remaining segment sizes is:

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

where

Segn is the a segment size for one segment of the remaining segments,

max is the maximum function of two variables,

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H + I$$

where

14 N_d is the number of storage devices
15 available to retain the segments of the
16 data object,
17 M_l is the maximum digital data transfer
18 load,
19 C_l is the current digital data transfer
20 load,
21 H is the file usage factor, and
22 I is the file interactivity factor.

1 20. (Original) The method of claim 1 wherein the data object is a video data
2 file to be transferred isochronously to the second computing system.

1 21. (Currently Amended) A digital data service system in communication with
2 a plurality of computing systems to provide at least one data object of a
3 plurality of data objects to at least one of the plurality of computing
4 systems, comprising:

5 a plurality of data object storage devices in communication with each
6 other and with any of the plurality of computing systems; and

7 a segmentation apparatus in communication with the plurality of data
8 object storage devices to fragment any of the data objects into a

9 plurality of segments to allow transfer to and processing by at least one
10 of the computing systems of said segments, wherein the segmentation
11 apparatus performs said fragmenting by the steps of:

12 requesting a range of addresses within a storage device containing
13 said data object,

14 determining a number of storage devices available to retain a
15 plurality of segments of said data object,

16 determining a maximum digital data transfer load for the storage
17 devices,

18 assigning a minimum segment size which is the smallest amount of
19 digital data to be contained within one segment of the data
20 object,

21 calculating a first segment size as a first function of a number of the
22 storage devices, the current digital data transfer load, the
23 maximum digital data transfer load, and the minimum segment
24 size,

25 assigning a last segment size as the minimum segment size,

26 calculating all remaining segment sizes as a second function of the
27 number of the storage devices, the current digital data transfer

28 load, the maximum digital data transfer load, and the minimum
29 segment size, and
30 partitioning said data object into segments whereby the first
31 segment of the data object is of the first segment size, the last
32 segment of the data object is of the last segment size, and all
33 the remaining segments of the data object is of the remaining
34 segment sizes;

35 ~~whereby the segmentation apparatus fragments each data object as a~~
36 ~~function of demand for the data objects, size of each data object of~~
37 ~~the plurality of data objects, amount of retention space available on~~
38 ~~each of the plurality of digital data storage devices, and available~~
39 ~~bandwidth for communication with the plurality of computing~~
40 ~~systems.~~

1 22. (Cancelled) The system of claim 21 wherein the segmentation apparatus
2 performs the steps of:

3 requesting a range of addresses within a storage device containing
4 said data object;

5 determining a number of storage devices available to retain a plurality
6 of segments of said data object;

7 determining a maximum digital data transfer load for the storage

8 devices;

9 assigning a minimum segment size which is the smallest amount of

10 digital data to be contained within one segment of the data object;

11 calculating a first segment size as a first function of a number of the

12 storage devices, the current digital data transfer load, the maximum

13 digital data transfer load, and the minimum segment size;

14 assigning a last segment size as the minimum segment size;

15 calculating all remaining segment sizes as a second function of the

16 number of the storage devices, the current digital data transfer

17 load, the maximum digital data transfer load, and the minimum

18 segment size; and

19 partitioning said data object into segments whereby the first segment

20 of the data object is of the first segment size, the last segment of

21 the data object is of the last segment size, and all the remaining

22 segments of the data object is of the remaining segment sizes.

1 23. (Currently Amended) The system of ~~claim 22~~ claim 21 wherein the
2 segmentation apparatus the further performs the steps of:

3 assigning one of the number of storage devices to retain each segment
4 of the data object;

5 assigning an address within the storage devices to identify the location
6 of an assigned segment;

7 assigning an object name to each segment of the data object; and

8 transferring each segment to its assigned storage device.

1 | 24. (Currently Amended) The system of ~~claim 22~~ claim 21 wherein the first
2 function to determine the first segment size is:

3
$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

4 where

5 **Seg1** is the first segment size,

6 **min** is the minimum function of two variables,

7 **SegSize_{min}** is the minimum segment size allowed
8 during the fragmenting of the video data file,

9 **V** is a total size of the data object, and

10 **f** is determined by the formula:

$$f = N_d + \left(\frac{M_l}{M_l - C_l} \right)$$

where

N_d is the number of storage devices
available to retain the segments of the
data object,

M_l is the maximum digital data transfer
load, and

C_l is the current digital data transfer
load.

25. (Currently Amended) The system of ~~claim 22~~ claim 21 wherein the second
function to determine the remaining segment sizes is:

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

where

Segn is the a segment size for one segment of the
remaining segments,

max is the maximum function of two variables,

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right)$$

where

N_d is the number of storage devices available to retain the segments of the data object,

M_l is the maximum digital data transfer load, and

C_i is the current digital data transfer load.

26. (Currently Amended) The system of ~~claim 22~~claim 21 further comprising the step of:

determining a file interactivity factor describing a number of jumps by the computing system within the data object.

27. (Original) The system of claim 26 wherein the first function is further dependent upon the file interactivity factor.

28. (Original) The system of claim 27 wherein the first function to determine the first segment size is:

$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

where

Seg1 is the first segment size,

min is the minimum function of two variables

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + I$$

where

14 N_d is the number of storage devices
15 available to retain the segments of the
16 data object,
17 M_i is the maximum digital data transfer
18 load,
19 C_i is the current digital data transfer
20 load, and
21 I is the file interactivity factor.

1 | 29. (Currently Amended) The system of ~~claim 22~~ claim 21 wherein the second
2 function is further dependent upon the file interactivity factor.

1 30. (Original) The system of claim 29 wherein the second function to
2 determine the remaining segment sizes is:

3
$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

4 where

5 Segn is the a segment size for one segment of the
6 remaining segments,

7 \max is the maximum function of two variables,

8 **SegSize_{min}** is the minimum segment size allowed

9 during the fragmenting of the video data file,

10 **V** is a total size of the data object, and

11 **f** is determined by the formula:

$$12 \quad \mathbf{f} = \mathbf{N}_d + \left(\frac{\mathbf{M}_l}{\mathbf{M}_l - \mathbf{C}_l} \right) + \mathbf{l}$$

13 where

14 **N_d** is the number of storage devices
15 available to retain the segments of the
16 data object,

17 M_l is the maximum digital data transfer
18 load,

19 **C_i** is the current digital data transfer
20 load, and

21 **I** is the file interactivity factor.

1 31. (Currently amended) The system of ~~claim 22~~claim 21 further comprising
2 the step of:

3 determining a file usage factor describing a number of requests for
4 said data object for a period of time.

1 32. (Original) The system of claim 31 wherein the first function is further
2 dependent upon the file usage factor.

1 33. (Original) The system of claim 32 wherein the first function to determine
2 the first segment size is:

3 **$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$**

4 where

5 **Seg1** is the first segment size,

6 **min** is the minimum function of two variables,

7 **SegSize_{min}** is the minimum segment size allowed
8 during the fragmenting of the video data file,

9 **V** is a total size of the data object, and

10 **f** is determined by the formula:

11 **$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H$**

12 where

13 N_d is the number of storage devices
14 available to retain the segments of the
15 data object,
16 M_l is the maximum digital data transfer
17 load,
18 C_l is the current digital data transfer
19 load, and
20 H is the file usage factor.

1 34. (Original) The system of claim 31 wherein the second function is further
2 dependent upon the file usage factor.

1 35. (Original) The system of claim 34 wherein the second function to
2 determine the remaining segment sizes is:

3
$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

4 where

5 Segn is the a segment size for one segment of the
6 remaining segments,

7 \max is the maximum function of two variables,

8 **SegSize_{min}** is the minimum segment size allowed
9 during the fragmenting of the video data file,

10 **V** is a total size of the data object, and

11 **f** is determined by the formula:

$$12 \quad f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H$$

13 where

14 N_d is the number of storage devices
15 available to retain the segments of the
16 data object,

17 M_l is the maximum digital data transfer
18 load,

19 C_i is the current digital data transfer
20 load, and

21 **H** is the file usage factor.

1 36. (Currently Amended) The system of ~~claim 22~~claim 21 further comprising

2 the steps of:

3 determining a file usage factor describing a number of requests for
4 said data object for a period of time; and

5 determining a file interactivity factor describing a number of jumps by
6 the computing system within the data object.

1 37. (Original) The system of claim 36 wherein the first function is further
2 dependent upon the file usage factor and the file interactivity factor.

1 38. (Original) The system of claim 37 wherein the first function to determine
2 the first segment size is:

3 **$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$**

4 where

5 **Seg1** is the first segment size,

6 **min** is the minimum function of two variables,

7 **SegSize_{min}** is the minimum segment size allowed
8 during the fragmenting of the video data file,

9 **V** is a total size of the data object, and

10 **f** is determined by the formula:

11

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H + I$$

12

where

13

N_d is the number of storage devices

14

available to retain the segments of the

15

data object,

16

M_i is the maximum digital data transfer

17

load,

18

C_i is the current digital data transfer

19

load,

20

H is the file usage factor, and

21

I is the file interactivity factor.

1 39. (Original) The system of claim 37 wherein the second function is further
2 dependent upon the file usage factor and the file interactivity factor.

1 40. (Original) The system of claim 39 wherein the second function to
2 determine the remaining segment sizes is:

3

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

4

where

Segn is the a segment size for one segment of the remaining segments,

max is the maximum function of two variables,

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H + I$$

where

N_d is the number of storage devices available to retain the segments of the data object,

M_1 is the maximum digital data transfer load,

C_i is the current digital data transfer load,

H is the file usage factor, and

22

I is the file interactivity factor.

1 41. (Original) The system of claim 21 wherein the data object is a video data
2 file to be transferred isochronously to the computing system.

1 42. (Original) An apparatus to segment a data object to facilitate transfer of
2 said data object from a first computing system to a second computing
3 system, comprising:

4 means for requesting a range of addresses within a storage device of
5 the first computing system containing said data object;

6 means for determining a number of storage devices attached to said
7 first computing system available to retain a plurality of segments of
8 said data object;

9 means for determining a maximum digital data transfer load for the
10 storage devices attached to said first computing system;

11 means for assigning a minimum segment size which is the smallest
12 amount of digital data to be contained within one segment of the
13 data object;

14 calculating a first segment size as a first function of a number of the
15 storage devices, the current digital data transfer load, the maximum
16 digital data transfer load, and the minimum segment size;

17 means for assigning a last segment size as the minimum segment
18 size;

19 means for calculating all remaining segment sizes as a second
20 function of the number of the storage devices, the current digital
21 data transfer load, the maximum digital data transfer load, and the
22 minimum segment size; and

23 means for partitioning said data object into segments whereby the first
24 segment of the data object is of the first segment size, the last
25 segment of the data object is of the last segment size, and all the
26 remaining segments of the data object is of the remaining segment
27 sizes.

1 43. (Original) The apparatus of claim 42 further comprising:

2 means for assigning one of the number of storage devices to retain
3 each segment of the data object;

4 means for assigning an address within the storage devices to identify
5 the location of an assigned segment;

6 means for assigning an object name to each segment of the data
7 object; and

8 means for transferring each segment to its assigned storage device.

44. (Original) The apparatus of claim 42 wherein the first function to determine the first segment size is:

$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

where

Seg1 is the first segment size,

min is the minimum function of two variables,

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right)$$

where

N_d is the number of storage devices available to retain the segments of the data object,

16 M_i is the maximum digital data transfer
17 load, and
18 C_i is the current digital data transfer
19 load.

1 45. (Original) The apparatus of claim 42 wherein the second function to
2 determine the remaining segment sizes is:

3
$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

4 where

5 **Segn** is the a segment size for one segment of the
6 remaining segments,

7 **max** is the maximum function of two variables,

8 **SegSize_{min}** is the minimum segment size allowed
9 during the fragmenting of the video data file,

10 **V** is a total size of the data object, and

11 **f** is determined by the formula:

12
$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right)$$

where

N_d is the number of storage devices available to retain the segments of the data object,

M_1 is the maximum digital data transfer load, and

C_i is the current digital data transfer load.

46. (Original) The apparatus of claim 42 further comprising:

means for determining a file interactivity factor describing a number of jumps by the second computing system within the data object.

47. (Original) The apparatus of claim 46 wherein the first function is further dependent upon the file interactivity factor.

48. (Original) The apparatus of claim 47 wherein the first function to determine the first segment size is:

$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

where

Seg1 is the first segment size,

min is the minimum function of two variables,

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + 1$$

where

N_d is the number of storage devices available to retain the segments of the data object,

M_l is the maximum digital data transfer load,

C_1 is the current digital data transfer load, and

I is the file interactivity factor.

49. (Original) The apparatus of claim 46 wherein the second function is further dependent upon the file interactivity factor.

50. (Original) The apparatus of claim 49 wherein the second function to
determine the remaining segment sizes is:

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

where

Segn is the a segment size for one segment of the
remaining segments,

max is the maximum function of two variables,

SegSize_{min} is the minimum segment size allowed
during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + 1$$

where

N_d is the number of storage devices
available to retain the segments of the
data object,

17 M_I is the maximum digital data transfer
18 load,
19 C_I is the current digital data transfer
20 load, and
21 I is the file interactivity factor.

1 51. (Original) The apparatus of claim 42 further comprising:

2 means for determining a file usage factor describing a number of
3 requests for said data object for a period of time.

1 52. (Original) The apparatus of claim 51 wherein the first function is further
2 dependent upon the file usage factor.

1 53. (Original) The apparatus of claim 52 wherein the first function to determine
2 the first segment size is:

3
$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

4 where

5 Seg1 is the first segment size,

6 \min is the minimum function of two variables,

SegSize_{min} is the minimum segment size allowed

during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H$$

where

N_d is the number of storage devices available to retain the segments of the data object,

M_i is the maximum digital data transfer load,

C_i is the current digital data transfer load, and

H is the file usage factor.

54. (Original) The apparatus of claim 51 wherein the second function is further dependent upon the file usage factor.

55. (Original) The apparatus of claim 54 wherein the second function to
determine the remaining segment sizes is:

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

where

Segn is the a segment size for one segment of the
remaining segments,

max is the maximum function of two variables,

SegSize_{min} is the minimum segment size allowed
during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H$$

where

N_d is the number of storage devices
available to retain the segments of the
data object,

17 M_i is the maximum digital data transfer
18 load,
19 C_i is the current digital data transfer
20 load, and
21 H is the file usage factor.

1 56. (Original) The apparatus of claim 42 further comprising the steps of:
2 determining a file usage factor describing a number of requests for
3 said data object for a period of time; and
4 determining a file interactivity factor describing a number of jumps by
5 the second computing system within the data object.

1 57. (Original) The apparatus of claim 56 wherein the first function is further
2 dependent upon the file usage factor and the file interactivity factor.

1 58. (Original) The apparatus of claim 57 wherein the first function to determine
2 the first segment size is:

3
$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

4 where

5 Seg1 is the first segment size,

min is the minimum function of two variables,

SegSize_{min} is the minimum segment size allowed
during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H + I$$

where

N_d is the number of storage devices
available to retain the segments of the
data object,

M_i is the maximum digital data transfer
load,

C_i is the current digital data transfer
load,

H is the file usage factor, and

I is the file interactivity factor.

59. (Original) The apparatus of claim 56 wherein the second function is further dependent upon the file usage factor and the file interactivity factor.

60. (Original) The apparatus of claim 57 wherein the second function to determine the remaining segment sizes is:

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

where

Segn is the a segment size for one segment of the remaining segments,

max is the maximum function of two variables,

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H + I$$

where

14 N_d is the number of storage devices
15 available to retain the segments of the
16 data object,
17 M_l is the maximum digital data transfer
18 load,
19 C_l is the current digital data transfer
20 load,
21 H is the file usage factor, and
22 I is the file interactivity factor.

1 61. (Original) The apparatus of claim 42 wherein the data object is a video
2 data file to be transferred isochronously to the second computing system.

1 62. (Original) A medium for retaining a computer program to segment a data
2 object to facilitate transfer of said data object from a first computing
3 system to a second computing system, whereby said computer program
4 executes the steps of:

5 requesting a range of addresses within a storage device of the first
6 computing system containing said data object;

7 determining a number of storage devices attached to said first
8 computing system available to retain a plurality of segments of said
9 data object;

10 determining a maximum digital data transfer load for the storage
11 devices attached to said first computing system;

12 assigning a minimum segment size which is the smallest amount of
13 digital data to be contained within one segment of the data object;

14 calculating a first segment size as a first function of a number of the
15 storage devices, the current digital data transfer load, the maximum
16 digital data transfer load, and the minimum segment size;

17 assigning a last segment size as the minimum segment size;

18 calculating all remaining segment sizes as a second function of the
19 number of the storage devices, the current digital data transfer
20 load, the maximum digital data transfer load, and the minimum
21 segment size; and

22 partitioning said data object into segments whereby the first segment
23 of the data object is of the first segment size, the last segment of
24 the data object is of the last segment size, and all the remaining
25 segments of the data object is of the remaining segment sizes.

- 1 63. (Original) The medium of claim 62 further executing the steps of:
- 2 means for assigning one of the number of storage devices to retain
- 3 each segment of the data object;
- 4 means for assigning an address within the storage devices to identify
- 5 the location of an assigned segment;
- 6 means for assigning an object name to each segment of the data
- 7 object; and
- 8 means for transferring each segment to its assigned storage device.

- 1 64. (Original) The medium of claim 62 wherein the first function to determine
- 2 the first segment size is:

3 **$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$**

4 where

5 **Seg1** is the first segment size,

6 **min** is the minimum function of two variables,

7 **SegSize_{min}** is the minimum segment size allowed

8 during the fragmenting of the video data file,

9 **V** is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right)$$

where

N_d is the number of storage devices
available to retain the segments of the
data object,

M_i is the maximum digital data transfer
load, and

C_i is the current digital data transfer
load.

65. (Original) The medium of claim 62 wherein the second function to
determine the remaining segment sizes is:

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

where

Segn is the a segment size for one segment of the
remaining segments,

max is the maximum function of two variables,

8 **SegSize_{min}** is the minimum segment size allowed
9 during the fragmenting of the video data file,

10 **V** is a total size of the data object, and

11

12 **f** is determined by the formula:

$$13 \quad \mathbf{f} = \mathbf{N}_d + \left(\frac{\mathbf{M}_l}{\mathbf{M}_l - \mathbf{C}_l} \right)$$

14 where

15 **N_d** is the number of storage devices
16 available to retain the segments of the
17 data object,

18 **M_i** is the maximum digital data transfer
19 load, and

20 **C_i** is the current digital data transfer
21 load.

1 66. (Original) The medium of claim 62 further executing the step of:

2 determining a file interactivity factor describing a number of jumps by
3 the second computing system within the data object.

1 67. (Original) The medium of claim 66 wherein the first function is further
2 dependent upon the file interactivity factor.

1 68. (Original) The medium of claim 67 wherein the first function to determine
2 the first segment size is:

3
$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

4 where

5 **Seg1** is the first segment size,

6 **min** is the minimum function of two variables,

7 **SegSize_{min}** is the minimum segment size allowed
8 during the fragmenting of the video data file,

9 **V** is a total size of the data object, and

10 **f** is determined by the formula:

11
$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + 1$$

12 where

13 N_d is the number of storage devices
14 available to retain the segments of the
15 data object,

16 M_l is the maximum digital data transfer
17 load,

18 C_l is the current digital data transfer
19 load, and

20 I is the file interactivity factor.

1 69. (Original) The medium of claim 66 wherein the second function is further
2 dependent upon the file interactivity factor.

1 70. (Original) The medium of claim 69 wherein the second function to
2 determine the remaining segment sizes is:

3
$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

4 where

5 Segn is the a segment size for one segment of the
6 remaining segments,

7 \max is the maximum function of two variables,

8 **SegSize_{min}** is the minimum segment size allowed
9 during the fragmenting of the video data file,

10 **V** is a total size of the data object, and

11 **f** is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + 1$$

13 where

14 N_d is the number of storage devices
15 available to retain the segments of the
16 data object,

17 **M_i** is the maximum digital data transfer
18 **load,**

19 C_i is the current digital data transfer
20 load, and

21 **I** is the file interactivity factor.

1 71. (Original) The medium of claim 62 further executing the step of:

2 determining a file usage factor describing a number of requests for
3 said data object for a period of time.

1 72. (Original) The medium of claim 71 wherein the first function is further
2 dependent upon the file usage factor.

1 73. (Original) The medium of claim 72 wherein the first function to determine
2 the first segment size is:

3
$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

4 where

5 **Seg1** is the first segment size,

6 **min** is the minimum function of two variables,

7 **SegSize_{min}** is the minimum segment size allowed
8 during the fragmenting of the video data file,

9 **V** is a total size of the data object, and

10 **f** is determined by the formula:

11
$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H$$

12 where

13 N_d is the number of storage devices
14 available to retain the segments of the
15 data object,
16 M_l is the maximum digital data transfer
17 load,
18 C_l is the current digital data transfer
19 load, and
20 H is the file usage factor.

1 74. (Original) The medium of claim 71 wherein the second function is further
2 dependent upon the file usage factor.

1 75. (Original) The medium of claim 74 wherein the second function to
2 determine the remaining segment sizes is:

3
$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

4 where

5 Segn is the a segment size for one segment of the
6 remaining segments,

7 \max is the maximum function of two variables,

8 **SegSize_{min}** is the minimum segment size allowed
9 during the fragmenting of the video data file,

10 **V** is a total size of the data object, and

11 **f** is determined by the formula:

$$12 \quad \mathbf{f} = \mathbf{N}_d + \left(\frac{\mathbf{M}_i}{\mathbf{M}_i - \mathbf{C}_i} \right) + \mathbf{H}$$

13 where

14 **N_d** is the number of storage devices
15 available to retain the segments of the
16 data object,

17 **M_i** is the maximum digital data transfer
18 **load,**

19 C_i is the current digital data transfer
20 load, and

21 **H** is the file usage factor.

1 76. (Original) The medium of claim 62 further comprising the steps of:

2 determining a file usage factor describing a number of requests for
3 said data object for a period of time; and

4 determining a file interactivity factor describing a number of jumps by
5 the second computing system within the data object.

1 77. (Original) The medium of claim 76 wherein the first function is further
2 dependent upon the file usage factor and the file interactivity factor.

1 78. (Original) The medium of claim 77 wherein the first function to determine
2 the first segment size is:

3
$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

4 where

5 **Seg1** is the first segment size,

6 **min** is the minimum function of two variables,

7 **SegSize_{min}** is the minimum segment size allowed
8 during the fragmenting of the video data file,

9 **V** is a total size of the data object, and

10 **f** is determined by the formula:

11
$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H + I$$

12 where

13 N_d is the number of storage devices
14 available to retain the segments of the
15 data object,

16 M_l is the maximum digital data transfer
17 load,

18 C_l is the current digital data transfer
19 load,

20 H is the file usage factor, and

21 I is the file interactivity factor.

1 79. (Original) The medium of claim 76 wherein the second function is further
2 dependent upon the file usage factor and the file interactivity factor.

1 80. (Original) The medium of claim 79 wherein the second function to
2 determine the remaining segment sizes is:

3
$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

4 where

5 Segn is the a segment size for one segment of the
6 remaining segments,

7 \max is the maximum function of two variables,

8 **SegSize_{min}** is the minimum segment size allowed

9 during the fragmenting of the video data file,

10 **V** is a total size of the data object, and

11 **f** is determined by the formula:

$$12 \quad f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H + I$$

13 where

14 **N_d** is the number of storage devices
15 available to retain the segments of the
16 data object,

17 M_i is the maximum digital data transfer
18 load,

19 C_i is the current digital data transfer
20 load,

21 **H** is the file usage factor, and

22 **I** is the file interactivity factor.

1 81. (Original) The medium of claim 62 wherein the data object is a video data
2 file to be transferred isochronously to the second computing system.

1 82. (Currently Amended) A video data file distribution system in
2 communication with a plurality of computing systems to provide at least
3 one video data file of a plurality of video data files to the plurality of
4 computing systems, comprising:

5 a plurality of video data file retention devices in communication with
6 each other and with any of the plurality of computing systems; and

7 a segmentation apparatus in communication with the plurality of video
8 data file retention devices to fragment any of the video data files
9 into a plurality of segments to allow transfer to and processing by at
10 least one of the computing systems of said segments, wherein the
11 segmentation apparatus performs said fragmenting by the steps of:
12 **[[:]**

13 requesting a range of addresses within a storage device of the first
14 computing system containing said video data file,

15 determining a number of storage devices attached to said first
16 computing system available to retain a plurality of segments of
17 said video data file,

18 determining a maximum digital data transfer load for the storage
19 devices attached to said first computing system,

20 assigning a minimum segment size which is the smallest amount of
21 digital data to be contained within one segment of the video
22 data file,

23 calculating a first segment size as a first function of a number of the
24 storage devices, the current digital data transfer load, the
25 maximum digital data transfer load, and the minimum segment
26 size,

27 assigning a last segment size as the minimum segment size,

28 calculating all remaining segment sizes as a second function of the
29 number of the storage devices, the current digital data transfer
30 load, the maximum digital data transfer load, and the minimum
31 segment size, and

32 partitioning said video data file into segments whereby the first
33 segment of the video data file is of the first segment size, the
34 last segment of the video data file is of the last segment size,
35 and all the remaining segments of the video data file is of the
36 remaining segment sizes.

37 ~~whereby the segmentation apparatus fragments each video data file as~~
38 ~~a function of demand for the video data files, size of each video~~
39 ~~data file of the plurality of video data files, amount of retention~~

40 ~~space available on each of the plurality of digital data retention~~
41 ~~devices, and available bandwidth for communication to the plurality~~
42 ~~of communication devices.~~

1 83. (Cancelled) The system of claim 82 wherein the segmentation apparatus
2 performs the steps of:

3 requesting a range of addresses within a storage device of the first
4 computing system containing said video data file;

5 determining a number of storage devices attached to said first
6 computing system available to retain a plurality of segments of said
7 video data file;

8 determining a maximum digital data transfer load for the storage
9 devices attached to said first computing system;

10 assigning a minimum segment size which is the smallest amount of
11 digital data to be contained within one segment of the video data
12 file;

13 calculating a first segment size as a first function of a number of the
14 storage devices, the current digital data transfer load, the maximum
15 digital data transfer load, and the minimum segment size;

16 assigning a last segment size as the minimum segment size;

17 calculating all remaining segment sizes as a second function of the
18 number of the storage devices, the current digital data transfer
19 load, the maximum digital data transfer load, and the minimum
20 segment size; and

21 partitioning said video data file into segments whereby the first
22 segment of the video data file is of the first segment size, the last
23 segment of the video data file is of the last segment size, and all
24 the remaining segments of the video data file is of the remaining
25 segment sizes.

1 84. (Original) The system of ~~claim 83~~ claim 82 wherein the segmentation
2 apparatus the further performs the steps of:

3 assigning one of the number of storage devices to retain each segment
4 of the video data file; and

5 assigning an address within the storage devices to identify the location
6 of an assigned segment.

1 85. (Original) The system of ~~claim 83~~ claim 82 wherein the first function to
2 determine the first segment size is:

3
$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

4 where

Seg1 is the first segment size,

min is the minimum function of two variables,

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right)$$

where

N_d is the number of storage devices available to retain the segments of the video data file,

M_l is the maximum digital data transfer load, and

C_i is the current digital data transfer load.

86. (Original) The system of ~~claim 83~~claim 82 wherein the second function to determine the remaining segment sizes is:

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

where

Segn is the a segment size for one segment of the remaining segments,

max is the maximum function of two variables,

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_l}{M_l - C_l} \right)$$

where

N_d is the number of storage devices available to retain the segments of the video data file,

M_l is the maximum digital data transfer load, and

C_1 is the current digital data transfer
load.

87. (Original) The system of ~~claim 83~~ claim 82 wherein the segmentation
apparatus further performs the step of:

determining a file interactivity factor describing a number of jumps by
the computing system within the video data file.

88. (Original) The system of claim 87 wherein the first function is further
dependent upon the file interactivity factor.

89. (Original) The system of claim 88 wherein the first function to determine
the first segment size is:

$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

where

Seg1 is the first segment size,

min is the minimum function of two variables,

SegSize_{min} is the minimum segment size allowed
during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + I$$

where

N_d is the number of storage devices
available to retain the segments of the
video data file,

M_i is the maximum digital data transfer
load,

C_i is the current digital data transfer
load, and

I is the file interactivity factor.

90. (Original) The system of claim 87 wherein the second function is further
dependent upon the file interactivity factor.

91. (Original) The system of claim 90 wherein the second function to
determine the remaining segment sizes is:

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

where

Segn is the a segment size for one segment of the remaining segments,

max is the maximum function of two variables,

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + I$$

where

N_d is the number of storage devices available to retain the segments of the video data file,

M_1 is the maximum digital data transfer load,

C_1 is the current digital data transfer load, and

I is the file interactivity factor.

1 92. (Original) The system of ~~claim 83~~ claim 82 wherein the segmentation
2 apparatus further performs the step of:

3 determining a file usage factor describing a number of requests for
4 said video data file for a period of time.

1 93. (Original) The system of claim 92 wherein the first function is further
2 dependent upon the file usage factor.

1 94. (Original) The system of claim 93 wherein the first function to determine
2 the first segment size is:

3
$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

4 where

5 **Seg1** is the first segment size,

6 **min** is the minimum function of two variables,

7 **SegSize_{min}** is the minimum segment size allowed
8 during the fragmenting of the video data file,

9 **V** is a total size of the data object, and

10 **f** is determined by the formula:

11

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H$$

12

where

13

N_d is the number of storage devices

14

available to retain the segments of the

15

video data file,

16

M_i is the maximum digital data transfer

17

load,

18

C_i is the current digital data transfer

19

load, and

20

H is the file usage factor.

1 95. (Original) The system of claim 92 wherein the second function is further
2 dependent upon the file usage factor.

1 96. (Original) The system of claim 95 wherein the second function to
2 determine the remaining segment sizes is:

3

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

4

where

Segn is the a segment size for one segment of the remaining segments,

max is the maximum function of two variables,

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H$$

where

N_d is the number of storage devices available to retain the segments of the video data file,

M_1 is the maximum digital data transfer load,

C_1 is the current digital data transfer load, and

H is the file usage factor.

1 97. (Original) The system of ~~claim 83~~ claim 82 further comprising the steps of:

2 determining a file usage factor describing a number of requests for
3 said data object for a period of time; and

4 determining a file interactivity factor describing a number of jumps by
5 the computing system within the data object.

1 98. (Original) The system of claim 97 wherein the first function is further
2 dependent upon the file usage factor and the file interactivity factor.

1 99. (Original) The system of claim 98 wherein the first function to determine
2 the first segment size is:

3
$$\text{Seg1} = \min(\text{SegSize}_{\min}, V/f)$$

4 where

5 **Seg1** is the first segment size,

6 **min** is the minimum function of two variables,

7 **SegSize_{min}** is the minimum segment size allowed
8 during the fragmenting of the video data file,

9 **V** is a total size of the data object, and

10 **f** is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H + I$$

where

N_d is the number of storage devices
available to retain the segments of the
data object,

M_i is the maximum digital data transfer
load,

C_i is the current digital data transfer
load,

H is the file usage factor, and

I is the file interactivity factor.

100. (Original) The system of claim 97 wherein the second function is further
dependent upon the file usage factor and the file interactivity factor.

101. (Original) The system of claim 100 wherein the second function to
determine the remaining segment sizes is:

$$\text{Segn} = \max(\text{SegSize}_{\min}, V/f)$$

where

Segn is the a segment size for one segment of the remaining segments,

max is the maximum function of two variables,

SegSize_{min} is the minimum segment size allowed during the fragmenting of the video data file,

V is a total size of the data object, and

f is determined by the formula:

$$f = N_d + \left(\frac{M_i}{M_i - C_i} \right) + H + I$$

where

N_d is the number of storage devices available to retain the segments of the data object,

M_1 is the maximum digital data transfer load,

C_1 is the current digital data transfer load,

H is the file usage factor, and

22

I is the file interactivity factor.

- 1 | 102. (Original) The system of ~~claim 83~~ claim 82 wherein the video data file is
2 | transferred isochronously to the computing system.